

IN THE CLAIMS

Claims: We Claim:

1. (Currently Amended) A ~~diffraction~~Diffraction grating element-(SG) arranged on or embedded within a light-transmissive, preferably planar waveguiding substrate-(S) and arranged to interact with an incident light wave (W) in order to couple the energy from said incident light wave (W) into said substrate-(S) to form at least one diffracted light wave-(R_{-1}, R_{+1}) propagating within said substrate-(S) and corresponding to at least one selected diffraction order, ~~characterized in that~~wherein the grating element-(SG) is divided into at least two different grating regions-($BG_{left}, BG_{right}, MBG_{left}, MBG_{right}$) each having different diffractive properties and arranged on opposite sides respect to a transition point-(TP) to form a splitted grating element, where the diffractions generated by said at least two different grating regions-($BG_{left}, BG_{right}, MBG_{left}, MBG_{right}$) are arranged to mutually compensate for thea variation in the input angle-(θ) of the incident light wave-(W) to thea total diffraction efficiency of the at least one diffracted light wave-(R_{-1}, R_{+1}) propagating within said substrate-(S).

2. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in that~~wherein in said splitted grating element-(SG) thea grating profile of at least one of the grating regions-($BG_{left}, BG_{right}, MBG_{left}, MBG_{right}$) has an asymmetric period profile, preferably a blazed period profile.

3. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in that~~wherein said splitted grating element-(SG) is arranged to be symmetrically splitted, ~~i.e. that is,~~ the element comprises two grating regions-(BG_{left}, BG_{right}) ~~whose~~having grating period profiles ~~are arranged as to be~~ substantially mirror images of each other with respect to a transition point-(TP).

4. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in that~~wherein~~in~~ said splitted grating element-(SG) comprises at least two grating regions-(BG_{left}, BG_{right}) ~~whose~~having grating period profiles ~~are arranged to have~~with substantially different depths.

5. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in that~~wherein in said splitted grating element-(SG) the _diffraction efficiency of at least one of the grating regions-(BG_{left}, BG_{right}, MBG_{left}, MBG_{right}) is arranged to vary at different local distances measured from the transition point-(TP).
6. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in that~~wherein the transition point-(TP) is ~~arranged to be~~ located within ~~the~~an area where the incident light wave-(W) first interacts with the splitted grating element-(SG).
7. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in that~~wherein ~~the~~a first interaction of the incident light wave-(W) with the splitted grating element-(SG) is arranged to take place substantially within a single grating region-(MBG_{right}).
8. (Currently Amended) The diffractive grating element-(SG) according to the claim 7, ~~characterized in that~~wherein at least one of the grating regions (MBG_{left}) is arranged to redirect or recirculate the light wave waveguided within the substrate-(S) back towards a reverse direction inside the substrate-(S).
9. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in that~~wherein~~wherein~~ the splitted grating element-(SG) is arranged to enlarge ~~the~~an exit pupil of an optical system.
10. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in that~~wherein the splitted grating element-(SG) is arranged to enlarge ~~the~~an exit pupil of a biocular or monocular optical system.
11. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in that~~wherein the splitted grating element-(SG) is arranged to enlarge ~~the~~an exit pupil of a virtual display.